

Can Better Mental Health Services Reduce the Risk of Juvenile Justice System Involvement?

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Current research on youths treated in US public mental health systems reveals that many have been or will be involved in the juvenile justice system (E.M. Foster and T. Connor, unpublished data, 2002).^{1,2} Other research suggests that the obverse is also true: many youths in the juvenile justice system suffer from mental health problems.^{3–6} While these conditions may have been preexisting, entry into the juvenile justice system probably exacerbates them. Many observers fear that time spent in juvenile justice residential facilities further traumatizes these young people and only worsens their mental health problems.⁷ Such findings suggest that keeping youths with emotional and behavioral problems out of the juvenile justice system should be a public health priority.

The overlap between the juvenile justice and mental health systems raises difficult questions surrounding service delivery to the children and youths straddling the 2 systems. One strategy for addressing these issues involves integration of and coordination between the mental health and juvenile justice systems. Such system-level coordination and collaboration is the focus of the so-called “system of care” approach to the delivery of mental health services, an approach that reflects a public health perspective on mental health problems.

Under a system of care, responsibility for meeting the mental health needs of children and youths resides at the community level rather than with a single agency. Various child-serving agencies, such as mental health and juvenile justice, coordinate and integrate service delivery. Such collaboration can involve strategic planning, interagency budgeting and cost sharing, implementation of comprehensive screening and assessment, case management, and cross-training of staff.⁸

When implemented, systems of care also involve changes in the types of mental health services delivered. These changes

Objectives. We evaluated how improved mental health services affect justice involvement among juveniles treated in the public mental health system.

Methods. Our analyses were based on administrative and interview data collected in 2 communities participating in the evaluation of a national initiative designed to improve mental health services for children and youths.

Results. Results derived from Cox proportional hazard models suggested that better mental health services reduced the risks of initial and subsequent juvenile justice involvement by 31% and 28%, respectively. Effects were somewhat more pronounced for serious offenses.

Conclusions. Our findings suggest that improved mental health services reduce the risk of juvenile justice involvement. (*Am J Public Health.* 2004;94:859–865)

generally increase the use of community-based alternatives (e.g., day treatment or partial hospitalization) to restrictive inpatient hospitalization, and they can involve services, such as multisystemic therapy,^{9–17} targeted specifically to young people with a history of serious delinquency.

Taken together, these elements of the system of care work to reduce juvenile justice involvement. As a result of system integration, youths with emotional and behavioral problems who break the law or engage in other offenses may have their problems identified more quickly and may be diverted into the mental health system. By targeting underlying mental health problems (such as aggression), mental health services may reduce the likelihood of a subsequent offense and contact with the juvenile justice system.

At present, little research exists on how systems of care affect juvenile justice involvement. One possible basis for such research is the Comprehensive Community Mental Health Services for Children and Their Families Program (the “Children’s Program”) funded by the Substance Abuse and Mental Health Services Administration. This program is fostering public sector systems of care throughout the country.

In several of the communities involved in the Children’s Program, juvenile justice is well integrated within the system of care. In Stark

County (Canton), Ohio, for example, juvenile justice is integrated with the system of care at several levels: program administration, financing, service delivery, and training for juvenile justice personnel. Administratively, the system of care operates under the aegis of the Stark County Family Council,¹⁸ whose board of trustees includes a juvenile justice official. The council administers pooled funds contributed by multiple child-serving agencies, including juvenile justice.

At the level of service delivery, the target population for the system of care comprises youths who are at risk of out-of-home placement and who are involved in multiple child-serving sectors, including juvenile justice. Furthermore, there is a cross-system service planning process in which juvenile justice personnel can participate, and mental health staff are stationed at juvenile justice facilities. Finally, the mental health agency provides juvenile justice personnel with training in mental health issues (e.g., principles of multisystemic therapy).

Stark County and 66 other communities are participating in an evaluation of the Children’s Program. This evaluation comprises both quantitative and qualitative elements; the former includes a longitudinal study of the children and youths served at each site. As a means of providing a group of comparison children and youths, 3 system-of-care

sites were matched with comparison communities. One pair involves the Stark County system and a comparison site in Mahoning County (Youngstown), Ohio. Using data from these sites, we examined whether the system of care can eliminate or delay involvement in juvenile justice among youths receiving mental health services. Our analyses employed hazard models to examine the timing of first involvement with the juvenile justice system and the likelihood of recidivism. Analyses incorporated prestudy differences in demographic characteristics and risk of juvenile justice involvement.

METHODS

Since 1994, the Center for Mental Health Services (CMHS) within the US Department of Health and Human Services has funded the development of systems of care through the Children's Program. The CMHS program provides communities with seed money to establish a system of care administrative structure. Communities draw on Medicaid, block grants, and other sources to actually fund services.

Design of Comparison Pairs Study

CMHS also has funded a national, multi-site evaluation. This evaluation, which provided the data for the present study, included a quasi-experimental study matching and comparing 3 system-of-care communities with 3 similar communities. As just described, 1 pair involved 2 Ohio communities. As part of the evaluation, a sample of 449 children and adolescents aged 6 to 17 years who had serious emotional and behavioral problems and were using mental health services were recruited for a longitudinal study. Study enrollment began in September 1997 and continued through October 1999, with follow-up data collection continuing through December 2000.

In the case of most of the study children and adolescents, entry into the study coincided with entry into the mental health service system. According to the core service data described subsequently, fewer than 1 in 4 participants had received mental health services more than 90 days before study entry. Among youths who had received services in

the past, therefore, entry into the study coincided with a new episode of care.

Data Source and Study Samples

Interview data. Data on youths' mental health status and family demographic characteristics were collected through face-to-face interviews conducted with caregivers and their children. Interviews were conducted at study entry and then at subsequent 6-month intervals. A comparison of baseline demographic characteristics revealed that the children enrolled in the study were relatively similar across the 2 communities (Table 1). Participants did differ, however, in regard to race/ethnicity and family income. Children in the system of care community were less likely

to be African American and to have a family income of more than \$15 000 per year. Other family characteristics, such as caregiver education and employment, were similar between the communities.

The caregiver interviews incorporated well-accepted measures of child mental health, such as the Child and Adolescent Functional Assessment Scale (CAFAS) and the Child Behavior Checklist (CBCL). The CAFAS assesses child functioning in 8 domains, while the CBCL assesses behavioral symptoms. As with the demographic data, these measures revealed both similarities and differences among the children in the 2 communities (Table 1). The participants had similar levels of overall clinical symptoms at intake (CBCL),

TABLE 1—Descriptive Sample Statistics, by Ohio County

	Mahoning County			Stark County			<i>P</i> ^a
	No. of Observations	Mean or %	SD	No. of Observations	Mean or %	SD	
Child age, y	216	11.51	3.27	232	11.13	3.10	.21
Female, %	216	31	0.46	232	35	0.48	.33
Household income, \$ (100s)	215	137.67	119.89	229	178.06	157.63	.00
Race/ethnicity, %							
Hispanic	216	8	0.28	231	1	0.11	.00
African American	216	53	0.50	232	29	0.46	.00
Mental health status							
Symptomatology (CBCL)	215	70.17	9.69	232	68.93	9.48	.17
Functioning (CAFAS)	215	78.09	24.64	227	70.75	25.45	.00
Family structure, %							
Caregiver married	215	25	0.43	232	29	0.46	.27
Parent in household	215	82	0.38	229	80	0.40	.52
Grandparent in household	215	11	0.31	229	10	0.30	.70
Caregiver education (omitted category: caregiver some college), %	215			232			
High school dropout		49	0.50		58	0.50	
High school diploma		17	0.38		15	0.35	.17
Some college		34	0.47		28	0.45	
Caregiver employment (omitted category: not working), %	213			232			
Not working		57	0.50		49	0.50	
Employed part time		20	0.40		18	0.39	.18
Employed full time		23	0.42		33	0.47	
Child educational status, %							
Receiving failing grades	212	37	0.48	228	32	0.47	.21
Repeated a grade	215	42	0.49	231	42	0.49	.98
Currently not in school	216	1	0.10	232	1	0.09	.94

Note. CBCL = Child Behavior Checklist; CAFAS = Child and Adolescent Functional Assessment Scale.

^a*P* values pertain to the null hypothesis of no between-site difference. Values less than .05 are shown in boldface.

TABLE 2—Involvement in the Juvenile Justice System in Ohio, by County

	Mahoning County		Stark County		<i>P</i> ^a
	No. of Observations	Mean or %	No. of Observations	Mean or %	
Ever involved in juvenile justice, %	217	47	232	39	.08
Characteristics among those involved in juvenile justice during study period					
Average age at first ^b offense	103	13.17	91	13.27	.75
First offense occurred after study entry, %	103	83	91	77	.25
First offense serious, ^c %	103	50	91	57	.29

^a*P* values pertain to the null hypothesis of no between-site difference.

^bFirst offense refers to the first offense occurring during the 1997–2000 period (see text for discussion).

^cSerious offenses are those that involve violent crimes, property crimes, alcohol and drug offenses, weapons offenses, criminal damaging and trespassing, and sexual offenses.

but children in the comparison community had higher levels of functional impairment (CAFAS).

Management information system data. The participating mental health centers in the 2 communities are behavioral health treatment organizations. Core mental health service data were derived from each agency's management information system, which is used for billing purposes. Services included in the data obtained from both communities were as follows: intake and assessment, case management, medication monitoring, and individual and group counseling. The system of care also offered day treatment, and the alternative system operated a short-term crisis residential center.

Data regarding juvenile justice involvement. To assess study participants' contact with juvenile justice systems, we extracted data from management information systems maintained by juvenile courts in the 2 communities for the years 1997 through 2000. The juvenile courts maintain current and historical information on all juvenile offenses, including offense type, date of court referral, adjudication, and disposition. A wide range of offenses are recorded in each management information system, examples being violent crimes, property crimes, criminal trespassing, disorderly conduct, alcohol- and drug-related offenses, weapons-related offenses, truancy and curfew violations, and probation violations.

Both official and unofficial cases are included in the management information sys-

tem data. Official cases funnel juveniles through the entire court process, including a court hearing, adjudication, and a final disposition. Unofficial cases involve actual offenses, but the cases are handled informally through agreements involving the youth's parents, a judge, and a probation officer.

These data allowed us to examine the timing of first and subsequent offenses and to differentiate offenses as "serious" or other. Serious offenses involve violent crimes, property crimes, alcohol and drug offenses, weapons offenses, criminal damaging and trespassing, and sexual offenses. Because some offenses may have occurred before the period for which juvenile justice data were available, the first and subsequent offenses may have represented the first and subsequent offenses that occurred during the 1997 to 2000 period only. However, this situation probably applied to a relatively small portion of the sample. Seventy-five percent of the participants were 12 years or younger at the beginning of the data collection period (more than half [55%] were 10 years or younger).

Hazard Model

Because they incorporate key data features, hazard (or event history) models were appropriate for our analysis of timing in regard to juvenile justice involvement.^{19–21} In particular, a hazard analysis incorporates the fact that participants in a given study enter and exit the observation period at different ages. In addition, such an analysis reflects the fact that the experiences of some individuals are "cen-

sored" (in the present case, the timing of future offenses was unknown). Furthermore, hazard analyses allowed us to incorporate the fact that youths entered this study in the midst of the risk period. Hazard analyses can incorporate study entry accurately by treating study participation as a time-varying covariate. This allowed the risk of juvenile justice involvement to rise or fall after study entry.

Hazard models can be implemented in several forms. We used the Cox proportional hazards model. A major advantage of this semiparametric model is that it does not impose a specific functional form for the baseline hazard profile (or the risk profile across age). The model does allow for the hazard to be shifted up or down by covariates. The resulting parameter estimates are best exponentiated and interpreted as hazard ratios (in the present case, the proportional effects of covariates on the risk of juvenile justice involvement). A hazard ratio greater or less than 1 corresponds to a characteristic that raises or lowers the risk of involvement.

The analyses described subsequently included a range of covariates. Our focus here is on 3 of these covariates: a site indicator, a "pre–post" indicator pertaining to study entry, and an interaction between these 2 factors. The first covariate captured between-site differences among participants before study entry. We interpreted preexisting between-site differences in juvenile justice involvement as reflecting differences between sites in regard to (1) underlying risk factors and (2) mental health referral patterns. (Even though the system of care was in place throughout the period, we did not interpret preentry differences as reflective of the system of care per se because the individuals involved were generally not receiving mental health services.) The second key covariate captured the difference in risk before and after study entry (and often into mental health services) for the comparison site. The interaction term captured the effect of interest: the between-site difference in the effect of study entry.

We also included a range of child and family characteristics as covariates (enumerated in Table 1 and described subsequently). Although only a handful of these characteristics exhibited between-site differences, we included them in the analyses to improve

TABLE 3—Predictors of Juvenile Justice Involvement, by Number and Type of Offenses

Predictor	Statistic	First Offenses		Second Offenses	
		All	Serious	All	Serious
Site (Stark County = 1; Mahoning County = 0)	Hazard ratio	1.26	1.30	1.21	1.20
	SE	0.27	0.33	0.33	0.55
	<i>t</i> statistic	1.08	1.06	0.70	0.39
Time (poststudy entry = 1)	Hazard ratio	0.78	0.95	0.78	1.42
	SE	0.26	0.36	0.27	0.59
	<i>t</i> statistic	-0.75	-0.15	-0.71	0.84
Time × Site interaction	Hazard ratio	0.58	0.46	0.64	0.32
	SE	0.19	0.17	0.26	0.18
	<i>t</i> statistic	-1.68	-2.11	-1.11	-2.03
Covariate					
Child age	Hazard ratio	0.91	0.96	1.14	1.15
	SE	0.10	0.11	0.17	0.21
	<i>t</i> statistic	-0.82	-0.38	0.88	0.75
Gender (female)	Hazard ratio	0.55	0.45	0.83	0.35
	SE	0.10	0.09	0.19	0.11
	<i>t</i> statistic	-3.34	-4.04	-0.81	-3.27
Household income	Hazard ratio	1.00	1.00	1.00	1.00
	SE	0.00	0.00	0.00	0.00
	<i>t</i> statistic	-0.40	0.03	-0.68	-1.26
Race/ethnicity					
Hispanic	Hazard ratio	1.63	1.02	1.11	1.64
	SE	0.54	0.45	0.47	0.94
	<i>t</i> statistic	1.47	0.04	0.25	0.86
African American	Hazard ratio	1.51	1.39	1.16	1.30
	SE	0.29	0.29	0.27	0.39
	<i>t</i> statistic	2.18	1.59	0.62	0.86
Mental health status					
Symptomatology	Hazard ratio	1.01	0.99	1.02	1.05
	SE	0.01	0.01	0.01	0.02
	<i>t</i> statistic	0.67	-0.68	1.07	2.39
Functioning	Hazard ratio	1.00	1.00	1.00	0.99
	SE	0.00	0.00	0.01	0.01
	<i>t</i> statistic	0.08	0.01	-0.46	-0.90
Family structure					
Caregiver married	Hazard ratio	0.98	1.00	1.23	1.86
	SE	0.18	0.21	0.30	0.69
	<i>t</i> statistic	-0.11	0.02	0.87	1.68
Parent in household	Hazard ratio	1.50	1.49	0.56	0.94
	SE	0.46	0.58	0.16	0.51
	<i>t</i> statistic	1.32	1.03	-2.02	-0.11
Grandparent in household	Hazard ratio	1.07	1.18	0.53	0.78
	SE	0.43	0.60	0.25	0.66
	<i>t</i> statistic	0.17	0.33	-1.35	-0.29
Caregiver education (dummy coded; omitted category: care giver some college)					
High school dropout	Hazard ratio	0.57	0.63	0.87	1.05
	SE	0.11	0.14	0.22	0.30
	<i>t</i> statistic	-2.82	-2.08	-0.56	0.19

Continued

and ensure between-site comparability. Stata²² software was used in calculating all parameter estimates.

RESULTS

Tables 1 through 3 and Figure 1 present the results of our analyses. Table 1 describes the sample in terms of demographic and mental health characteristics. On average, the study children were 11 years of age at baseline, and the majority were male. Given that the children were being treated in public systems, socioeconomic status was low. Family incomes averaged less than \$20 000 at the 2 sites. Roughly half of the caregivers were high school dropouts (49% and 58% in Mahoning and Stark counties, respectively); only a minority were working full time. Most of the children lived with a single parent. (Roughly 80% of the households in which youths resided included a parent. In most of these households [approximately 70%], the caregiver was not married.)

As one would expect, the youths involved in the study were struggling. At baseline, 42% reported having repeated a grade (Table 1); roughly 1 in 3 reported receiving failing grades. Furthermore, juvenile justice involvement was common (Table 2): 47% and 39% of the Mahoning and Stark county youths, respectively, were involved in the juvenile justice system during the course of the study. The average age at which these youths first encountered the juvenile justice system was 13 years. A majority first entered the juvenile justice system after study entry: 83% and 77% in Mahoning and Stark counties, respectively. This difference was not statistically significant; however, the fact that more youths had preentry contact with the juvenile justice system in Stark (23%) than in Mahoning (17%) probably reflected the integration of the mental health and juvenile justice systems in the former. Table 2 also provides basic data on offense severity. At both sites, 50% or more of first offenses were serious.

Figure 1 presents the key findings from the hazard analyses. (The full results are described subsequently and presented in Table 3.) The first 2 pairs of bars represent the risk of juvenile justice involvement after study entry relative to the prestudy period.

TABLE 3—Continued

Completed high school	Hazard ratio	0.65	0.64	0.89	0.96
	SE	0.17	0.19	0.27	0.41
	<i>t</i> statistic	-1.68	-1.52	-0.37	-0.09
Caregiver employment (dummy coded; omitted category: not working)					
Caregiver employed part time	Hazard ratio	0.99	1.24	1.50	2.14
	SE	0.24	0.32	0.44	0.78
	<i>t</i> statistic	-0.05	0.84	1.36	2.09
Caregiver employed full time	Hazard ratio	1.19	1.18	1.30	2.64
	SE	0.23	0.27	0.31	0.86
	<i>t</i> statistic	0.89	0.72	1.09	2.98
Child educational status					
Receiving failing grades	Hazard ratio	1.32	1.39	1.82	0.97
	SE	0.24	0.28	0.42	0.26
	<i>t</i> statistic	1.51	1.62	2.57	-0.10
Repeated a grade	Hazard ratio	1.08	0.96	1.12	1.62
	SE	0.19	0.20	0.27	0.49
	<i>t</i> statistic	0.41	-0.18	0.47	1.58
Not in school	Hazard ratio	7.37	3.87	1.70	3.82
	SE	3.40	1.65	0.85	2.49
	<i>t</i> statistic	4.32	3.18	1.06	2.06
Previous juvenile justice involvement					
Age at first offense	Hazard ratio	... ^a	... ^a	1.00	1.00
	SE	... ^a	... ^a	0.00	0.00
	<i>t</i> statistic	... ^a	... ^a	2.17	0.53
Whether first offense was "severe"	Hazard ratio	... ^a	... ^a	0.68	... ^b
	SE	... ^a	... ^a	0.14	... ^b
	<i>t</i> statistic	... ^a	... ^a	-1.83	... ^b
No. of observations		420	420	227 ^c	186 ^d

Note. Covariates significant at the .05 level are shown in boldface.

^aThese covariates are not included here because the analyses focused on the first offense.

^bThis covariate is not included here because the first offense that defined the at-risk period for a subsequent offense was limited to the severe offense category.

^cThese analyses were limited to individuals who committed an initial offense.

^dThese analyses were limited to individuals who committed an initial serious offense.

A similar pattern emerged for offenses of all types. Hazard ratios fell after study entry at both sites, with a greater reduction occurring in Stark. The between-site difference in regard to serious crimes was especially large. The risk of a second, serious offense actually increased after study entry in Mahoning.

The full set of results is presented in Table 3, which includes hazard ratios for all of the covariates assessed. It can be seen in the first column that the hazard ratio for site was greater than 1 (1.26), indicating that children in Stark County were at greater risk of juvenile justice involvement before study entry. As discussed earlier, this difference was expected given the system of care philosophy; interagency coordination should result in the juvenile justice system referring more children into services. The hazard ratio for time was less than 1 (0.78), indicating a reduction in risk after study entry. Finally, the interaction term was also less than 1 (0.58), indicating a greater reduction over time in Stark County.

Table 3 also includes hazard ratios for the child and demographic characteristics described earlier. Results showed that female youths were 45% less likely than male youths to be involved in the juvenile justice system (column 1; hazard ratio=0.55). In addition, non-White youths were 51% more likely than White youths to be involved (hazard ratio of 1.51). The effect of the covariates did vary somewhat across outcomes. For example, receipt of failing grades at baseline was associated with higher hazard ratios for all covariates other than recidivism in regard to serious crimes (the effect was greatest [and statistically significant] for the risk of recidivism).

DISCUSSION

This study examined the impact of coordinated and integrated mental health services on juvenile justice involvement among youths served in the public mental health system. Using data from a quasi-experiment, we assessed between-site differences using hazard models. As mentioned, these models were well suited to addressing the research question of interest here because they can accommodate key data features, principally, in the present case, the fact that youths entered the study (and mental health services) during the

At both sites, the risk of initial juvenile justice involvement dropped after study entry. This decrease was greater in Stark County (-54%) than in Mahoning County (-22%). (We calculated these figures using the hazard ratios described subsequently. For example, the second bar, representing the 22% risk reduction in Mahoning after study entry, pertained to a time variable hazard ratio of 0.78. The figure for Stark corresponded to the product of the hazard ratio for the time variable [0.78] and the Time \times Site interaction [0.58], which was 0.46. This hazard ratio implied a 54% reduction in risk. The significance level of the

between-site difference was that associated with the Time \times Site interaction.)

The between-site difference was significant at a marginal level ($P=.09$). However, in the case of serious crimes the between-site difference was substantially greater and statistically significant ($P=.03$). While the likelihood of youths committing a serious crime after study entry remained largely unchanged in Mahoning, this likelihood dropped by 57% in Stark.

The second 2 pairs of bars represent recidivism, or the likelihood of the occurrence of a second offense. These analyses were limited to youths who had committed a first offense.

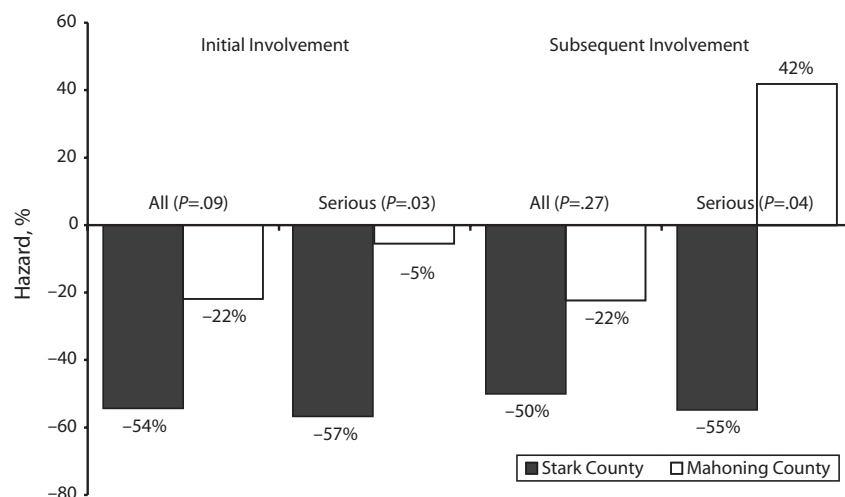


FIGURE 1—Risk of juvenile justice involvement: hazard analysis results.

midst of the period in which they were at risk for involvement in the juvenile justice system.

While previous research has examined the mental health needs of youths involved in the juvenile justice system, relatively little attention has been focused on whether system integration can reduce such involvement. Our results were derived from only 2 communities and are subject to other limitations, but they suggest that community-based care coordinated across child-serving agencies can reduce or delay entry into the juvenile justice system as well as recidivism among those who have been involved in the system. These relationships were stronger for more serious offenses.

Our study also links juvenile justice involvement to a range of other youth and family characteristics. The relationships we found were generally consistent with those revealed in other research. We found, for example, that juvenile justice involvement is more likely for boys and for non-White youths. Also, youths who are struggling in school tend to have a higher risk of involvement. However, there were some surprising relationships as well. For example, youths living with a grandparent were more likely to be involved in the juvenile justice system. In this case, causality could have been reversed: the youth's behavior may have led to the grandparent moving into the household.

Although provocative, our results are subject to several limitations. Principal among these limitations are possible between-site differences in children and youths receiving mental health services. Youths in Stark County may have been less likely to become involved in the juvenile justice system for reasons not captured here. This possibility is counterintuitive, however: the system of care there attempted to draw youths involved in the juvenile justice system into the mental health system. If anything, one would expect youths in Stark to have been otherwise *more* likely to become involved in the juvenile justice system; thus, our results may be conservative.

In any case, we did adjust between-site comparisons with a variety of baseline characteristics, including mental health symptomatology and functioning. Furthermore, our analyses incorporated information on juvenile justice involvement before study entry. Nevertheless, the results presented here should be interpreted as preliminary, and they require replication in other communities and with other study designs (perhaps including randomization).

An important question for future research is whether a public health-oriented strategy of avoiding juvenile justice placements among youths with emotional and behavioral problems is cost-effective. A full economic analysis would depend on how the costs of identifying and treating the mental health problems of a

large group of at-risk youths compare with those related to detaining a subset of such individuals in the future. The answer to this question awaits future research. ■

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Contributors

E.M. Foster conceived the study and was responsible for all analyses and for writing the article. A. Qaseem assisted in the analyses and in preparation of the article. T. Connor assisted in preparation of the article.

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Human Participant Protection

This study, which involved analyses of secondary data, was approved by the Pennsylvania State University office for research protections. The original study was approved by the Office of Management and Budget and the institutional review board of ORC Macro Inc. All study participants signed informed consent forms.

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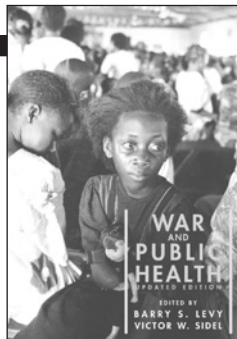
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